

### **REMARKS**

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-1945, under Order No. BBNT-P01-086 from which the undersigned is authorized to draw.

In the Office Action dated September 28, 2007, the Examiner objects to the specification because of alleged informalities; rejects claim 6 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention; rejects claims 1, 7, 11, 14, and 30 under 35 U.S.C. § 102(b) as allegedly being anticipated by Kubala et al., “Integrated Technologies for Indexing Spoken Language”, Communications of the ACM, vol. 43, No. 2, February 2000 (hereafter “KUBALA”); rejects claims 2 and 12 under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of Beigi et al., “A Distance Measure Between Collections of Distributions and its Application to Speaker Recognition”, IEEE 1998, p. 753 (hereinafter “BEIGI”); rejects claims 4-6, 8-10, 15-18, 21, and 22 under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of Liu et al., “Fast Speaker Change Detection for Broadcast News Transcription and Indexing”, EUROSPEECH 1999, vol. 3, pp. 1031-1034 (hereinafter “LIU”); rejects claims 3, 13, 23-26, and 31 under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of Siegler et al., “Automatic Segmentation, Classification, and Clustering of Broadcast News Audio”, 1997

(hereinafter “SIEGLER”); and rejects claims 27-29 under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view SIEGLER and further in view of LIU. Applicants respectfully traverse these rejections.

By way of the present amendment, Applicants have amended claims 1, 11, 18, and 30 to improve form, and have cancelled claims 3, 13, 20, 25, and 31 without prejudice or disclaimer. No new matter has been added. Claims 1-2, 4-12, 14-19, 21-24, and 26-30 are pending.

Initially, Applicants filed a Supplemental Information Disclosure Statement (IDS) on May 18, 2007. The Examiner did not consider the Foreign Patent Documents EP-1 422 692 A2 and JP-361285570A, as well as U.S. Patent No. 6,748,350 on the Form 1449 with no explanation of why the documents were not considered by the Examiner. Applicants respectfully request that the Examiner consider these documents, initial at the appropriate places on the Form 1449, and return a copy of the Form 1449 with the next communication.

The specification stands objected to because of alleged informalities. Applicants respectfully traverse this objection.

The Examiner alleges (Office Action, p. 2) that the generalized likelihood test as disclosed on p. 16 of Applicants’ specification is contrary to the standard hypothesis from the generalized likelihood test, as indicated by Fancourt et al., “On the Use of Neural Networks in the Generalized Likelihood Ratio Test for Detecting Abrupt Changes in Signals”, IEEE 2000, p. 243 (hereinafter “FANCOURT”). Applicants disagree with the Examiner’s allegations.

FANCOURT discloses the likelihood ratio in equation 1, on p. 244. Equation 1 of FANCOURT discloses that the posited hypothesis  $H_1$  is the numerator of the fraction and the null

hypothesis  $H_0$  is the denominator of the fraction. FANCOURT goes on to disclose that a change is detected if the decision function exceeds a predefined threshold.

In contrast, paragraph [0051] of Applicants' specification discloses a generalized likelihood ratio test where the posited hypothesis is the denominator of the fraction and the null hypothesis is the numerator of the fraction. Paragraph [0052] of Applicants' specification discloses that if the function is above a predetermined threshold, the two vectors are considered to be similar to one another. Therefore, the generalized likelihood ratio test as disclosed in paragraphs [0051] and [0052] of Applicants' specification is not contrary to the standard generalized likelihood test.

For at least the foregoing reasons, Applicants respectfully request that the Examiner's objection to the specification be reconsidered and withdrawn.

Claim 6 stands rejected under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully traverse this rejection.

The Examiner alleges that "wherein a speaker change is detected when the generalized likelihood ratio test produces a value less than a preset threshold" is ambiguous and contrary to the standard hypothesis from the generalized likelihood ratio test, as indicated by FANCOURT (Office Action, p. 3).

Applicants submit that for at least reasons similar to the reasons set forth above with respect to the Examiner's objection to the specification, claim 6 is definite under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph. Accordingly, Applicants respectfully request that the rejection of claim 6 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, be reconsidered and withdrawn.

Claims 1, 7, 11, 14, and 30 stand rejected under 35 U.S.C. 102(b) as being allegedly anticipated by KUBALA, and pending claims 23-24, and 26 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of SIEGLER.

Applicants have amended independent claims 1, 11 and 30 to include features similar to features previously presented in claims 3, 13 and 31 (now cancelled). The Examiner rejected claims 3, 13, and 31 under 35 U.S.C. § 103(a) based on KUBALA and SIEGLER. Thus, Applicants will address pending claims 1, 7, 11, 14, 23-24, 26, and 30 as rejected under 35 U.S.C. § 103(a) based on KUBALA and SIEGLER. Applicants respectfully traverse this rejection.

Amended independent claim 1 is directed to a method for detecting speaker changes in an input audio stream. The method includes segmenting the input audio stream into predetermined length intervals such that portions of the intervals overlap one another, decoding the intervals to produce a set of phones corresponding to each of the intervals, generating a similarity measurement based on a first portion of the audio stream that is within one of the intervals and that occurs prior to a boundary between adjacent phones in one of the intervals and a second portion of the audio stream that is within the one of the intervals and that occurs after the boundary, detecting speaker changes based on the similarity measurement, and outputting an indication of the detected speaker changes. KUBALA and SIEGLER, whether taken alone or in any reasonable combination, do not disclose or suggest this combination of features.

For example, KUBALA and SIEGLER do not disclose or suggest segmenting an input audio stream into predetermined length intervals such that portions of the intervals overlap one another, as recited in amended claim 1. This feature is similar to a feature previously recited in claim 3 (now

cancelled). The Examiner relied on the first paragraph on p. 53 of KUBALA for allegedly disclosing “segmenting the input audio stream into predetermined length intervals” (Office Action, p. 4). Applicants disagree with the Examiner’s interpretation of KUBALA.

The 1<sup>st</sup> paragraph on p. 53 of KUBALA discloses that the first stage of a gender-independent phone-class recognition pass is to label the input frames as speech or non-speech. The phoneme inventory is collapsed into three broad classes along with five different models for typical non-speech phenomena. The Examiner relies on the input frames as allegedly corresponding to “segmenting the input audio stream into predetermined length intervals” (Office Action, p. 4). However, KUBALA does not disclose that the input frames are predetermined length intervals. KUBALA does not disclose or suggest anything about the length of the input frames. Therefore, KUBALA cannot disclose or suggest segmenting the input audio stream into predetermined length intervals such that portions of the intervals overlap one another, as recited in amended claim 1.

Furthermore, the Examiner admits that KUBALA does not disclose or suggest segmenting the input audio stream into predetermined length intervals such that portions of the intervals overlap one another, as recited in amended claim 1 (Office Action, p. 15). The Examiner relies on section 3 of SIEGLER for allegedly disclosing this feature (Office Action, p. 16). Applicants disagree with the Examiner’s interpretation of SIEGLER.

Section 3 of SIEGLER discloses that the ultimate goal of segmentation is to produce a sequence of discrete utterances with particular characteristics constant within each utterance. In a Hub 4 system, different models were constructed for a fixed set of acoustic classes. For each class, a Gaussian model was constructed and a maximum likelihood selection for each class was done

over a sliding window of audio. To perform segmentation without acoustic classes, a KL2 distance was used instead of the generalized likelihood ratio. To accomplish this, means and variances were estimated for a two second window placed at every point in the audio stream. When the distance between bordering windows reached a local maximum, a new segment boundary was generated. The segment boundaries were the beginning and ending points for the segments.

The Examiner relies on the two second sliding window placed at every point of the audio stream as allegedly corresponding to the predetermined length intervals such that portions of the intervals overlap one another (Office Action, p. 16). However, the two second sliding window disclosed by SIEGLER is used for estimating means and variances, which are in turn used to determine when the KL2 distance between bordering windows reaches a local maximum. The two second sliding window is not used to segment the input audio stream into predetermined length intervals such that portions of the intervals overlap one another, as would be required by claim 1 based on the Examiner's interpretation of SIEGLER. Instead, the segment boundaries in SIEGLER are generated by the KL2 algorithm when the distance between bordering windows reaches a local maximum. SIEGLER does not disclose or suggest segmenting an input audio stream into predetermined length intervals such that portions of the intervals overlap one another, as recited in amended claim 1.

Therefore, even if the method of KUBALA were combined with the method of SIEGLER, the combination would not disclose or suggest each of the features of claim 1. Further, even if for the sake of argument, the combination of KUBALA and SIEGLER could be fairly construed to

disclose or suggest each of the features of claim 1, Applicants assert that the motivation to combine KUBALA and SIEGLER does not satisfy the requirements of 35 U.S.C. § 103.

For example, with regard to motivation, the Examiner alleges (Office Action, p. 16):

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to create overlapping intervals in Kubala, since overlapping segments would minimize segmentation errors by ensuring that speaker boundaries are determined at word boundaries instead of in the middle of words.

Applicants disagree with the Examiner's allegation. Overlapping segments would not ensure that speaker boundaries are determined at word boundaries. The creating of overlapping segments in no way guarantees that the speaker boundaries are determined at word boundaries instead of in the middle of words. Therefore, the Examiner's allegation lacks merit.

For at least the foregoing reasons, Applicants submit that claim 1 is patentable over KUBALA and SIEGLER, whether taken alone or in any reasonable combination. Accordingly, Applicants respectfully request that the rejection of claim 1 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Claim 7 depends from claim 1. Therefore, this claim is patentable over KUBALA and SIEGLER, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 1. Accordingly, Applicants respectfully request that the rejection of claim 7 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Claim 11 recites features similar to, yet possibly of different scope than, features recited above with respect to claim 1. Therefore, claim 11 is patentable over KUBALA and SIEGLER for at least reasons similar to reasons set forth above with respect to claim 1. Accordingly, Applicants

respectfully request that the rejection of claim 11 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Claim 14 depends from claim 11. Therefore, this claim is patentable over KUBALA and SIEGLER, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 11. Accordingly, Applicants respectfully request that the rejection of claim 14 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Independent claim 23 recites features similar to, yet possibly of different scope than, features recited above with respect to claim 1. Therefore, claim 23 is patentable over KUBALA and SIEGLER for at least reasons similar to reasons set forth above with respect to claim 1. Accordingly, Applicants respectfully request that the rejection of claim 23 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Claims 24 and 26 depend from claim 23. Therefore, these claims are patentable over KUBALA and SIEGLER, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 23. Accordingly, Applicants respectfully request that the rejection of claims 24 and 26 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Independent claim 30 recites features similar to, yet possibly of different scope than, features recited above with respect to claim 1. Therefore, claim 30 is patentable over KUBALA and SIEGLER for at least reasons similar to reasons set forth above with respect to claim 1. Accordingly, Applicants respectfully request that the rejection of claim 30 under 35 U.S.C. § 103 based on KUBALA and SIEGLER be reconsidered and withdrawn.

Claims 2 and 12 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of BEIGI. Claims 1 and 11 were addressed as rejected under 35 U.S.C. § 103(a) based on KUBALA in view of SIEGLER. Therefore, claims 2 and 12 will be addressed as rejected under 35 U.S.C. § 103(a) based on KUBALA in view of SIEGLER, and further in view of BEIGI. Applicants respectfully traverse this rejection.

Claim 2 depends from claim 1. Without acquiescing in the Examiner's rejection of claim 2, Applicants submit that BEIGI does not overcome the deficiencies of KUBALA and SIEGLER set forth above with respect to claim 1. Therefore, claim 2 is patentable over KUBALA, SIEGLER, and BEIGI, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 1. Accordingly, Applicants respectfully request that the rejection of claim 2 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and BEIGI be reconsidered and withdrawn.

Claim 12 depends from claim 11. Without acquiescing in the Examiner's rejection of claim 12, Applicants submit that BEIGI does not overcome the deficiencies of KUBALA and SIEGLER set forth above with respect to claim 11. Therefore, claim 12 is patentable over KUBALA, SIEGLER, and BEIGI, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 11. Accordingly, Applicants respectfully request that the rejection of claim 12 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and BEIGI be reconsidered and withdrawn.

Claims 4-6, 8-10, 15-18, and 21-22 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of LIU. Claims 1 and 11 were addressed as rejected

under 35 U.S.C. § 103(a) based on KUBALA in view of SIEGLER. Therefore, claims 4-6, 8-10, 15-18, and 21-22 will be addressed as rejected under 35 U.S.C. § 103(a) based on KUBALA in view of SIEGLER, and further in view of LIU. Applicants respectfully traverse this rejection.

Claims 4-6 and 8-10 depend from claim 1. Without acquiescing in the Examiner's rejection of claims 4-6 and 8-10, Applicants submit that LIU does not overcome the deficiencies of KUBALA and SIEGLER set forth above with respect to claim 1. Therefore, claims 4-6 and 8-10 are patentable over KUBALA, SIEGLER, and LIU, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 1. Accordingly, Applicants respectfully request that the rejection of claims 4-6 and 8-10 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and LIU be reconsidered and withdrawn.

Claims 15-17 depend from claim 11. Without acquiescing in the Examiner's rejection of claims 15-17, Applicants submit that LIU does not overcome the deficiencies of KUBALA and SIEGLER set forth above with respect to claim 11. Therefore, claims 15-17 are patentable over KUBALA, SIEGLER, and LIU, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 11. Accordingly, Applicants respectfully request that the rejection of claims 15-17 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and LIU be reconsidered and withdrawn.

Independent claim 18 recites features similar to, yet possibly of different scope than, features recited above with respect to claim 1. Without acquiescing in the Examiner's rejection of claim 18, Applicants submit that LIU does not overcome the deficiencies of KUBALA and SIEGLER set forth above with respect to claim 1. Therefore, Applicants submit that claim 18 is patentable over

KUBALA, SIEGLER, and LIU, whether taken alone or in any reasonable combination, for at least reasons similar to reasons set forth above with respect to claim 1. Accordingly, Applicants respectfully request that the rejection of claim 18 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and LIU be reconsidered and withdrawn.

Claims 21 and 22 depend from claim 18. Therefore, Applicants submit that claims 21 and 22 are patentable over KUBALA, SIEGLER, and LIU, whether taken alone or in any reasonable combination, for at least the reasons set forth above with respect to claim 18. Accordingly, Applicants respectfully request that the rejection of claims 21 and 22 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and LIU be reconsidered and withdrawn.

Claims 27-29 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over KUBALA in view of SIEGLER and further in view of LIU. Applicants respectfully traverse this rejection.

Claims 27-29 depend from claim 23. Without acquiescing in the Examiner's rejection of claims 27-29, Applicants submit that LIU does not overcome the deficiencies of KUBALA and SIEGLER set forth above with respect to claim 23. Therefore, Applicants submit that claim 23 is patentable over KUBALA, SIEGLER, and LIU, whether taken alone or in any reasonable combination, for at least reasons similar to reasons set forth above with respect to claim 23. Accordingly, Applicants respectfully request that the rejection of claims 27-29 under 35 U.S.C. § 103 based on KUBALA, SIEGLER, and LIU be reconsidered and withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's reconsideration of this application, and the timely allowance of the pending claims.

If the Examiner does not believe that all pending claims are now in condition for allowance, the Examiner is urged to contact the undersigned to expedite prosecution of this application.

As Applicants' amendments and remarks with respect to the Examiner's rejections are sufficient to overcome the rejections, Applicants' silence as to assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, assertions as to dependent claims, etc.) is not a concession by Applicants that such assertions are accurate or such requirements have been met, and Applicants reserve the right to analyze and dispute such assertions/requirements in the future.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 18-1945 and please credit any excess fees to such deposit account.

Dated: December 28, 2007

Respectfully submitted,

/Michael J. Chasan/  
Michael J. Chasan  
Registration No.: 54,026  
ROPES & GRAY LLP  
1211 Avenue of the Americas  
New York, New York 10036  
(212) 596-9000  
(212) 596-9090 (Fax)  
Attorneys/Agents For Applicant